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THIRTY-THIRD ANNUAL REPORT

OF

THE BOARD OF WATER COMMISSIONERS

OF

THE CITY OF ST. PAUL MINNESOTA

YEAR ENDED DECEMBER 31st, 1914

THE PIONEER COMPANY, ST. PAUL
1915

Compliments of

Board of Water Commissioners

and

Garrett O. House

General Superintendent

PLEASE EXCHANGE.

THIRTY-THIRD ANNUAL REPORT

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JUL 5 1916

OF

THE BOARD OF WATER COMMISSIONERS

OF

THE CITY OF ST. PAUL MINNESOTA

YEAR ENDED DECEMBER 31st, 1914

THE PIONEER COMPANY, ST. PAUL
1915

OFFICERS

OF

BUREAU OF WATER

DEPARTMENT OF PUBLIC UTILITIES

THE CITY OF ST. PAUL

DECEMBER 31, 1914.

BOARD OF WATER COMMISSIONERS.

OSCAR E. KELLER, President, . . . Commissioner of Public Utilities
M. N. GOSS, ... Commissioner of Public Works
S. A. FARNSWORTH, ... Commissioner of Finance
J. I. FARICY, Secretary, ... City Clerk
JOHN C. FLANAGAN, Assistant Secretary.

OFFICERS.

GARRETT O. HOUSE, General Superintendent.
JOHN C. FLANAGAN, Chief Accountant.
C. M. CROWLEY, Registrar.
ROSCOE L. SMITH, Principal Assistant Civil Engineer.
MARTIN FEIST, Superintendent of Mechanical Equipment.
OSCAR CLAUSSEN, City Engineer, Chief Engineer.

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THIRTY-THIRD ANNUAL REPORT

OF

THE BOARD OF WATER COMMISSIONERS

St. Paul, Minn., Jan. 1, 1915.

Prior to June 1, 1914, when the Commission Charter became effective, the Water Department was governed by an appointive Board of Water Commissioners, composed of:

LOUIS F. DOW, President.
CARL P. DAHLBY, Vice President.
ISAAC LEDERER.
HANS MADSON.
HENRY H. MILLER.

Since June 1, 1914, the Bureau of Water has been under the control and management of an elective Board of Water Commissioners composed of:

OSCAR E. KELLER,
Commissioner of Public Utilities, President and Executive Officer.
M. N. GOSS, Commissioner of Public Works.
S. A. FARNSWORTH, Commissioner of Finance.

The financial policy and business routine established by the appointive board was found to be sound and satisfactory for conducting the Bureau efficiently.

v.33, 36, 1914, 1919 Cont'd

THE WATER DEPARTMENT of THE CITY OF SAINT PAUL.
FINANCIAL STATEMENT.
STATEMENT "A."
December 31, 1914.

ASSETS		Condition as at Above Date	Condition as at Corresponding Date Last Year	LIABILITIES		Condition as at Above Date	Condition as at Corresponding Date Last Year
COST OF ACQUISITION AND CONSTRUCTION:				BONDED INDEBTEDNESS:			
(As per Statement "B")		$6,056,442.11	$5,778,051.51	Bonds Issued		$3,110,000.00	$3,060,000.00
Deduct: Frontage Tax (to Dec. 31, 1912)		1,907,665.58	1,907,677.58	Deduct: Bonds Redeemed		1,153,000.00	1,058,000.00
		4,148,776.53	3,870,373.93	Bonds Outstanding		1,957,000.00	2,002,000.00
SINKING FUND:				ACCRUED INTEREST ON BONDS		19,273.40	19,898.37
Investments	$112,500.00		79,000.00	SUNDRY CREDITORS:			
Uninvested	384.42		43,589.41	Audited Vouchers	$25,886.51		64,679.19
		112,884.42		Refunds in Suspense	286.65		286.65
ACCOUNTS RECEIVABLE:				Unclaimed Wages	23.90		12.40
Meter Accounts	12,644.42		13,005.03	Outstanding Accounts			1,284.61
Miscellaneous	31,020.94		21,485.34			26,197.06	
Frontage Tax	96,134.84		89,447.56	PAYMENTS IN ADVANCE:			
Hydrant Rental (City of St. Paul)	9,400.00		9,000.00	Water Rates	9,031.37		12,065.52
		149,200.20		Meter Setting	1,627.50		2,855.00
INVENTORY:				Service Connections	210.81		90.46
Supplies and Material	48,014.21		31,418.19	Fire Protection	1,522.98		724.26
Tools and Equipment	16,706.80		16,647.50	Paving Replacements	1,118.97		1,093.20
Office Furniture and Equipment	6,620.65		6,509.65			13,511.63	
		71,341.66		SURPLUS:			
CASH:				Balance January 1, 1914	2,374,609.50		2,270,614.77
Balance with City Treasurer	127,475.49		294,683.87	ADD:			
In hands of Assistant Secretary and Cashier	2,908.75		4,438.68	Excess of Revenue over Operating Expenses and Maintenance Charges, including Fixed Charges on Bonded Indebtedness (Statement "C")	136,721.07		99,996.78
		130,384.24		Premium on Sale of Bonds	2,894.50		30.00
				Premium on Securities	.....		193.75
				Sinking Fund Earnings	1,895.01		3,774.20
				Sundry Adjustments	80,484.88		
						2,596,604.96	
		$4,612,587.05	$4,479,599.16			$4,612,587.05	$4,479,599.16

STATEMENT "B."

STATEMENT OF EXPENDITURES FOR ACQUISITION OR CONSTRUCTION OF PROPERTIES.

Expenditures to January 1, 1914		$5,778,051.51
Expenditures for Additions and Improvements during year 1914:		
Lands, Reservations and Water Rights	$3,658.32	
Roads, Crossings and Fences	85.28	
Buildings on Watershed	1,684.03	
Pumping Equipment	12,043.73	
Distribution Mains and Appurtenances	189,669.79	
Fire Hydrants and Hydrant Connections	609.05	
New Meters	30,545.62	
Storehouses, Stables and Shop Buildings and Equipment	34,080.56	
General Office Building—Addition	826.49	
General Offices—Administration	5,187.73	
.....		278,390.60
Expenditure to December 31st, 1914 (as shown on Statement "A")		$6,056,442.11

STATEMENT "C."

OPERATING EXPENSES AND REVENUE STATEMENT FOR THE YEAR ENDED DECEMBER 31, 1914.

CLASSIFICATION OF EXPENDITURE.	Item	Total
GENERAL ADMINISTRATION:		
Executive Expenses	$11,814.28	
Auditing and Accounting	2,573.04	
Purchasing and Storekeeping	4,304.98	
		$18,692.30
WATER SUPPLY:		
Administration	12,073.99	
Collection and Storage	9,633.94	
Purification	1,976.33	
Pumping	31,394.20	
Distribution	28,017.41	
Analyzing and Testing	28.23	
Meter Setting, Testing and Repairing	11,301.68	
		94,425.78
WATER REVENUE COLLECTION:		
Administration	2,844.35	
Auditing and Accounting	27,751.12	
Inspection	14,324.88	
		44,920.35
Total Operating Expenses and Maintenance Charges		158,038.43
DEDUCT:		
Indirect Expenses Charged to Outside Parties (Statement "D")		13,404.44
Net Operating Expenses and Maintenance Charges		144,633.99
DEBT SERVICE:		
Sinking Fund Instalments	83,400.00	
Interest on Bonded Debt	88,321.28	
		171,721.28
SURPLUS—Carried to Financial Statement (Statement "A")		136,721.07
		$453,076.34

CLASSIFICATION OF REVENUE.	Item	Total
REVENUE FROM SALE OF WATER:		
Meter Accounts, including Penalties	$271,090.54	
Flat Rates, including Penalties	32,334.08	
Building Purposes	517.40	
Sewer Flushing	401.43	
Street Sprinkling	13,796.23	
Miscellaneous	2,273.07	
		$320,412.75
OTHER REVENUE:		
Fire Protection, including Hydrant Rental	54,142.06	
Rentals (Real Estate)	1,380.00	
Frontage Tax	77,141.53	
		132,663.59
Total Revenue		453,076.34
		$453,076.34

STATEMENT "D."

STATEMENT OF RECOVERABLE EXPENDITURES

FOR YEAR ENDED DECEMBER 31, 1914.

	Cost of Labor and Material	Charges
NEW INSTALLATIONS:		
Service Connections	$50,231.22	$60,466.89
Meter Setting	5,915.99	10,265.18
Temporary Mains	3,434.07	2,345.95
Automatic Sprinklers and Private Fire Hydrants	2,573.62	2,691.44
REPAIRS	3,788.62	4,351.83
TURNING ON AND OFF:		
New Service	859.94	.....
Old Service	1,595.16	957.50
MISCELLANEOUS	1,616.49	2,340.76
	$70,015.11	$83,419.55
		70,015.11
Excess of Charges Over Cost (Representing Provision for Overhead Expenses), (Carried to Statement "C")		$13,404.44

STATEMENT "E."

CASH RECEIPTS AND DISBURSEMENTS.

For Year Ended December 31, 1914.

Balance on Hand January 1, 1914		$299,122.55
RECEIPTS:		
Meter Accounts	$271,127.99	
Flat Rates	29,728.45	
Building Purposes	408.03	
Sewer Flushing	389.39	
Fire Protection (including Hydrant Rental)	54,539.63	
Service Connections	50,498.47	
Meter Setting	8,980.00	
Turning On	931.00	
Repairs	4,174.59	
Rents from Properties	1,345.00	
Miscellaneous Accounts Receivable	25,719.10	
Frontage Tax	70,234.85	
Sinking Fund Earnings	2,413.33	
Unclaimed Wages	35.00	
Audited Vouchers (Cancelled)	14.00	
Interest on Bonds Sold	268.75	
Sale of Bonds (4½%)	50,000.00	
Premium on Sale of Bonds	2,894.50	
Sale of Scrap	166.00	
		573,868.08
		$872,990.63
DISBURSEMENTS:		
Salaries and Wages	$209,050.88	
Material and Supplies	103,114.35	
Miscellaneous Expenses	45,239.54	
Acquisition or Construction	162,494.03	
Water Rates and Charges Refunded	3,023.37	
Interest on Bonds	89,215.00	
Sinking Fund	129,013.33	
Unclaimed Wages	23.50	
Outstanding Accounts (Prior Year)	1,262.09	
Office Furniture and Equipment	111.00	
Tools and Equipment	59.30	
		742,606.39
Balance on Hand December 31, 1914, as per Financial Statement (Statement "A")		$130,384.24

STATEMENT "F."

SINKING FUND FOR REDEMPTION OF BONDS.

INVESTED.

January 1, 1914, Total Invested		$79,000.00
August 1, 1914, Securities Purchased		43,500.00
December 19, 1914, Securities Purchased		40,000.00
		$162,500.00
DEDUCT—Securities Sold:		
March 15, 1914		50,000.00
Invested at December 31, 1914 (Statement "A")		$112,500.00

UNINVESTED.

January 1, 1914, Balance		$43,589.41
ADD:		
Reserved from Revenue During Year 1914		83,400.00
Interest on Securities		1,895.01
Securities Sold		50,000.00
		$178,884.42
DEDUCT:		
Securities Purchased During Year 1914	$83,500.00	
Redemption 30-year, 5% Bonds, which Matured April 1, 1914	95,000.00	
		178,500.00
Balance at December 31, 1914 (Statement "A")		$384.42

STATEMENT "G."

SINKING FUND INVESTMENTS.

Date of Purchase	Date Due	DESCRIPTION	Par Value	Interest Rate	Annual Interest Receivable
June 17, 1899	May 2, 1917	Ramsey County Court House and City Hall Bonds Nos. 522 and 523	$2,000.00	4½%	$90.00
Feb. 9, 1900	Jan. 1, 1915	Ramsey County Court House and City Hall Bonds Nos. 274 to 289 Inclusive	16,000.00	5%	800.00
Nov. 20, 1913	Aug. 31, 1937	St. Paul School Bonds Nos. 9996 and 9997	2,000.00	4%	80.00
Dec. 22, 1913	Aug. 1, 1919	St. Paul Sewer Bonds Nos. 8145 to 8152 Inclusive and 8133	9,000.00	4%	360.00
Aug. 1, 1914	Aug. 1, 1919	Hospital Building Bonds Nos. 8178 to 8181 Inclusive and 8183 to 8219 Inclusive	41,000.00	4%	1,640.00
Aug. 1, 1914	Aug. 31, 1938	Hospital Bonds Nos. 10504 and 10505	2,000.00	4%	80.00
Aug. 1, 1914	Apr. 30, 1938	School Bond No. 10386	500.00	4%	20.00
Dec. 19, 1914	July 1, 1919	St. Paul Bridge Bonds Nos. 7911 and 7912; 7915 to 7921 Inclusive	9,000.00	4%	360.00
Dec. 19, 1914	Jan. 1, 1920	St. Paul Wagon Bridge Bonds Nos. 8218 and 8343 to 8345 Inclusive	4,000.00	4%	160.00
Dec. 19, 1914	May 1, 1920	West St. Paul Levee Bonds Nos. 8710 and 8729	2,000.00	4%	80.00
Dec. 19, 1914	Aug. 1, 1919	St. Paul Sewer Bonds Nos. 8031, 8034, 8039, 8040 and 8110 to 8115 Inclusive and 8162 to 8164 Inclusive	13,000.00	4%	520.00
Dec. 19, 1914	May 1, 1920	St. Paul Sewer Bond No. 8585	1,000.00	4%	40.00
Dec. 19, 1914	May 31, 1937	St. Paul Park Bonds Nos. 9934 to 9944 Inclusive	11,000.00	4%	440.00
			$112,500.00		$4,670.00

FRONTAGE TAX RECEIVABLE DECEMBER 31st, 1914.

STATEMENT "H."

	Year 1907 and Prior	Year 1908	Year 1909	Year 1910	Year 1911	Year 1912	Year 1913	Year 1914	Advance Payments	Total
Balance Due at December 31, 1913	$962.89	$933.56	$1,226.46	$2,437.30	$2,929.14	$5,984.86	$75,071.43		(Cr.) $98.08	$89,447.56
Assessment Levied for 1914								$76,884.41		76,884.41
Debit Adjustments							121.86		(Dr.) 24.52	146.38
Total Charges	$962.89	$933.56	$1,226.46	$2,437.30	$2,929.14	$5,984.86	$75,193.29	$76,884.41	(Cr.) $73.56	$166,478.35
Deduct:										
Collections During 1914:										
February, 1914			$15.64	$26.94	$127.95	$1,767.91	$1,000.55			$2,938.99
March, 1914			3.60	6.10	13.83	89.43	1,293.13			1,406.09
April, 1914	$11.10			4.00	13.15	114.13	2,136.11			2,278.49
May, 1914			3.30	6.42	31.75	183.43	4,144.66	$24.52		4,394.08
July, 1914		$7.81	14.32	24.58	44.37	1,088.42	37,718.65			38,898.15
November, 1914	8.00	4.00		4.00	8.00	14.50	1,611.32			1,649.82
December, 1914				4.25	17.50	36.70	18,635.30			18,693.75
Credit Adjustments							52.20	31.94		84.14
Total Collections and Adjustments	$19.10	$11.81	$36.86	$76.29	$256.55	$3,294.52	$66,591.92	$56.46		$70,343.51
Balance Due at December 31, 1914 (Statement "A")	$943.79	$921.75	$1,189.60	$2,361.01	$2,672.59	$2,690.34	$8,601.37	$76,827.95	(Cr.) $73.56	$96,134.84

STATEMENT "I."

BOND ACCOUNT DECEMBER 31, 1914.

Date Authorized	Bonds Authorized	Bonds Issued	Date Issued	Date Due	Interest Rate	Bonds Purchased and Cancelled	Bonds Outstanding	Total Annual Interest Payable
January 26, 1883	$500,000.00							
February 21, 1885	800,000.00	$400,000.00	April 1, 1885	April 1, 1915	5 %	$20,000.00	$380,000.00	$19,000.00
January 31, 1887	200,000.00	200,000.00	May 2, 1887	May 2, 1917	4½%	8,000.00	192,000.00	8,640.00
January 31, 1887	160,000.00	300,000.00	March 1, 1888	March 1, 1918	4½%	.....	300,000.00	13,500.00
		100,000.00	Jan. 1, 1889	Jan. 1, 1919	4½%	5,000.00	95,000.00	4,275.00
		160,000.00	Jan. 2, 1889	Jan. 2, 1919	4½%	20,000.00	140,000.00	6,300.00
		100,000.00	May 1, 1889	May 1, 1919	4½%	.....	100,000.00	4,500.00
		100,000.00	May 1, 1890	May 1, 1920	4 %	.....	100,000.00	4,000.00
*November 6, 1906	500,000.00	50,000.00	April 1, 1907	March 31, 1937	4 %	.....	50,000.00	2,000.00
		50,000.00	Oct. 1, 1907	Oct. 1, 1937	4 %	.....	50,000.00	2,000.00
		50,000.00	Nov. 1, 1908	Nov. 1, 1938	4 %	.....	50,000.00	2,000.00
		50,000.00	July 1, 1909	July 1, 1939	4 %	.....	50,000.00	2,000.00
		100,000.00	March 1, 1912	Feb. 28, 1942	4 %	.....	100,000.00	4,000.00
		70,000.00	May 1, 1913	May 1, 1933	4½%	.....	70,000.00	3,150.00
		80,000.00	May 1, 1913	May 1, 1943	4½%	.....	80,000.00	3,600.00
		50,000.00	April 1, 1914	April 1, 1944	4½%	.....	50,000.00	2,250.00
March 31, 1913	500,000.00	150,000.00	Aug. 1, 1913	Aug. 1, 1943	4½%	.....	150,000.00	6,750.00
		$2,010,000.00				$53,000.00	$1,957,000.00	$87,965.00

*Popular Vote.

STATEMENT "J."

CONTRACTS MADE BY THE BOARD OF WATER COMMISSIONERS JANUARY 1st TO DECEMBER 31st, 1914.

No.	Name	Purpose	Amount	Amount Paid to Dec 31, 1914	Balance Due	Date of Contract
1	Lynchburg Foundry Co	30 inch Cast Iron Water Pipe	$47,930.59	$47,930.59	.....	Jan. 14-14
2	Lynchburg Foundry Co	24 inch and 30 inch Cast Iron Specials	1,601.88	1,601.88	.....	Jan. 14-14
3	American Cast Iron Pipe Co	4 inch to 20 inch Cast Iron Water Pipe	38,419.23	38,419.23	.....	Jan. 14-14
4	American Cast Iron Pipe Co	4 inch to 20 inch Cast Iron Specials	1,213.87	1,213.87	.....	Jan. 14-14
5	Cochran-Sargent Co	Brass Goods	4,752.03	4,752.03	.....	Jan. 16-14
6	The Western Supply Co	Valve and Service Boxes	7,499.06	7,499.06	.....	Jan. 16-14
7	N. W. Shot & Lead Works	Pig Lead	5,171.93	5,171.93	.....	Jan. 16-14
8	South Park Foundry & Mach. Co	Fire Hydrants	5,877.50	5,877.50	.....	Jan. 16-14
9	A. W. M. Anderson	Removing old and setting new boiler at Centerville	605.50	605.50	.....	Jan. 16-14
10	Jas. J. Kirwan	Hauling 4 inch to 20 inch pipe, etc	2,248.07	2,248.07	.....	Jan. 16-14
11	Pittsburgh Meter Co	Water Meters	23,770.00	23,770.00	.....	Jan. 3-14
12	Struchen-Nelson Construction Co	Tool Storage Bldg., Distribution Yd. No. 1	2,796.00	2,796.00	.....	Jan. 5-14
13	The Kennedy Valve Mfg. Co	Water Gates or Valves	3,787.80	3,787.80	.....	Jan. 27-14
14	Builders Iron Foundry Co	30 inch Venturi Meter	1,185.00	1,185.00	.....	Feb. 9-14
15	John Mulligan	Hauling 30 inch Pipe, etc	1,042.85	1,042.85	.....	Feb. 11-14
16	N. W. Shot & Lead Works	130 tons lead pipe and 2,000 lbs. solder	11,953.78	11,953.78	.....	Feb. 17-14
17	The Haggart Construction Co	Laying 30 inch pipe—Low Service Main No. 2	27,272.10	25,905.97	$1,366.13	Feb. 17-14
18	The Pioneer Co	Printing Annual Report	183.75	183.75	.....	Apr. 1-14
19	Thos. Becken & Son	Main Building, Garage and Barn—Distribution Yd. No.1	18,463.20	18,463.20	.....	Apr. 13-14
20	Swanson Bros	Heating System in Buildings—Distribution Yd. No. 1	1,860.00	1,496.00	364.00	Apr. 13-14
21	John E. Holt Plumbing & Heating Co	Plumbing in Buildings—Distribution Yd. No. 1	906.90	906.90	.....	Apr. 13-14
22	Nimis & Nimis	Electrical Installation in Bldgs.—Distribution Yr. No. 1	642.00	642.00	.....	Apr. 13-14
23	North Western Fuel Co	Fuel McCarron and Centerville Stations	12,000.00	6,541.52	5,458.00	May 8-14
24	Citizens Ice & Fuel Co	Fuel West Side Pumping Station	1,250.00	637.20	612.80	May 8-14
25	Carnegie Fuel Co	Fuel Office Building	Cancelled			May 8-14
26	Twin City Iron & Wire Works	Front Fence—Distribution Yd. No. 1	806.35	806.35	.....	May 8-14
27	Builders Iron Works Co	Rear Fence—Distribution Yd. No. 1	700.00	700.00	.....	May 8-14
28	Chicago Bridge & Iron Works	Steel Tower and Tank—St. Anthony Pk.	6,240.00	6,240.00	.....	May 28-14
29	Henry R. Worthington	2 Centrifugal Pumps—St. Anthony Pk	1,398.00	699.00	699.00	May 29-14
30	Arthur Lilygren	Ford Auto Touring Car	699.14	699.14	.....	May 29-14
31	Maloney Motor Car Co	Velie Auto Truck	2,314.52	2,314.52	.....	May 29-14
32	Builders Iron Foundry Co	8 inch Venturi Meter	515.00	515.00	.....	July 14-14
33	American Cast Iron Pipe Co	Cast Iron Pipe	13,501.94	13,501.94	.....	Aug. 14-14
34	Lynchburg Foundry Co	Special Iron Castings	2,088.66	2,088.66	.....	Sept. 8-14
35	Northwestern Shot & Lead Works	10 tons Pig Lead	1,260.17	1,260.17	.....	Oct. 10-14
36	Cameron & Co	Constructing Pumping Station—St. Anthony Pk	2,584.00	1,522.95	1,061.05	Oct. 5-14
37	Kielland Engineering Co	Plumbing in Pumping Station—St. Anthony Pk	171.00	.....	171.00	Oct. 9-14
38	Olson-Boettger Electric Mfg. Co	Electrical work in Pumping Station—St. Anthony Pk	198.00	.....	198.00	Oct. 9-14
39	Healy Plumbing & Heating Co	Heating in Pumping Station—St. Anthony Pk	240.00	.....	240.00	Oct. 9-14
			$255,149.82	$244,979.36	$10,170.46	

STATEMENT "K."

CONTRACTS MADE PRIOR TO JANUARY 1, 1914, AND PAID DURING THE YEAR 1914.

No.	Date 1914	Name	Purpose	Amount Due Jan. 1, 1914	Amount Paid 1914
1	Jan. 1	Pittsburgh Meter Co.	Water Meters	$8,760.00	$8,760.00
3	Jan. 16	A. P. Smith Mnfg. Co.	Brass Goods	835.78	835.78
6	April 7	James Shiely	Drayage	264.50	264.50
7	April 8	So. Park Foundry & Machine Co.	Fire Hydrants	308.00	308.00
8	April 8	So. Park Foundry & Machine Co.	Special Castings	308.46	308.46
9	April 8	Western Supply Co.	Valve and Service Boxes	847.00	847.00
10	April 16	So. Park Foundry & Machine Co.	Valves	408.65	408.65
13	July 13	North Western Fuel Co.	Fuel—McCarron Station	4,570.00	4,570.00
14	July 7	Womack-Fooshe Coal Co.	Fuel—Centerville Station	1,690.00	1,690.00
15	July 7	Pittsburgh Coal Co.	Fuel—Vadnais and West St. Paul Stations	1,130.00	1,130.00
20	Dec. 10	John D. Roberts	Boiler for Centerville Station	755.00	755.00
				$19,877.39	$19,877.39

STATEMENT "L."

PUMPING PLANTS—COST OF MAINTENANCE.

Stations	Salaries	Fuel	Waste and Machine Oil	Supplies and Repairs	Light and Power	Total
McCarron (High Service)	$9,809.88	$7,996.83	$177.26	$506.31	$25.83	$18,516.11
Vadnais Lake Station	1,438.18	.....	30.99	50.71	40.86	1,560.74
West Saint Paul Station	2,738.52	1,104.20	90.46	72.04	123.24	4,128.46
Centerville Station	3,311.88	2,788.71	148.94	267.75	61.11	6,578.39
Madson Wells	8.76	6.50	.....	.....	385.00	400.26
St. Anthony Park Pump	110.53	.....	.....	84.46	15.25	210.24
TOTAL	$17,417.75	$11,896.24	$447.65	$981.27	$651.29	$31,394.20

STATEMENT "M."

REPORT ON WATER SUPPLIED THROUGH METERS.

For Year Ended December 31st, 1914.

Month	Consumption			Revenue			Average Rate Per 100 Cu. Ft. (Exclusive of Penalties)			Penalties Imposed
	Domestic (Cu. Ft.)	Commercial (Cu. Ft.)	Total (Cu. Ft.)	Domestic	Commercial	Total	Domestic (Cents)	Commercial (Cents)	All Supplies (Cents)	
January, 1914	18,149,900	18,350,100	36,500,000	$12,934.57	$11,324.77	$24,259.34	7.13	6.17	6.66	$64.25
February	12,236,600	17,882,600	30,119,200	9,474.78	11,182.47	20,657.25	7.74	6.25	6.86	94.55
March	11,802,311	16,491,300	28,293,611	9,900.25	10,272.67	20,172.92	8.39	6.23	7.13	71.10
April	19,763,484	17,220,200	36,983,684	14,469.83	10,744.34	25,214.17	7.32	6.24	6.82	68.60
May	12,367,470	16,597,400	28,964,870	9,707.92	10,340.05	20,047.97	7.85	6.23	6.92	111.00
June	12,696,610	17,498,000	30,194,610	10,176.60	10,868.15	21,044.75	8.02	6.21	6.97	85.75
July	20,887,220	18,207,800	39,095,020	14,526.81	11,317.00	25,843.81	6.95	6.22	6.61	74.10
August	17,516,599	18,364,500	35,881,099	11,920.29	11,390.01	23,310.30	6.80	6.20	6.50	128.85
September	16,908,200	17,285,600	34,193,800	11,890.73	10,749.52	22,640.25	7.03	6.21	6.62	111.75
October	22,217,595	17,840,000	40,057,595	15,293.13	11,134.91	26,428.04	6.88	6.24	6.60	87.50
November	13,996,222	17,420,300	31,416,522	10,520.84	10,893.70	21,414.54	7.52	6.25	6.82	125.75
December	12,858,607	15,523,500	28,382,107	10,594.02	9,733.29	20,327.31	8.24	6.27	7.16	92.90
TOTAL....	191,400,818	208,681,300	400,082,118	$141,409.77	$129,950.88	$271,360.65	7.39	6.23	6.78	$1,116.10
Percentages	47.84%	52.16%	100%	52.11%	47.89%	100%				

NOTE.—"Domestic" consists of ⅝ inch and ¾ inch services and read quarterly by dividing City into three districts and reading one district each month.

"Commercial" consists of all supplies 1 inch and over and read monthly.

SUMMARY OF STATISTICS.

In Form Recommended by the New England Water Works Association.

GENERAL STATISTICS.

Population of census of 1900, 163,000; and 1910. 215,000
Last City Directory, summer 1914..... 251,240
Date of organization—1862.
By whom owned—The City of Saint Paul, Minn.
Source of Supply—Chain of Lakes and Artesian Wells.
Mode of Supply—Gravity and by pumping to stand pipes and reservoir.

PUMPING STATISTICS.

1. Builders of Pumping Machinery—E. P. Allis Co., Allis-Chalmers Co., G. F. Blake Co., Aldrich Pump Co., American Well Works, Harris Air Pump Co., Ingersoll Rand Co.

2. Description of fuel—
   a. Kind: Bituminous.
   b. Brand of coal: Youghiogheny Lump and Smokeless Mine Run.
   c. Average cost per gross ton:
   c. Average cost per net ton: $4.86.
   d. Percentage of Ash: 5% Std. coal bought on B. T. U. basis.
   e. Wood per cord: $6.50.

3. Coal consumed for the year: 5,214,896 lbs.

4. (Pounds of wood consumed) ÷ 3—equivalent amount of coal, 264,620 lbs.

5. Total equivalent of coal consumed for year (3) plus (4): 5,479,516 lbs.

6. Total pumpage for the year (gallons):

A—McCarron	3,899,181,135
B—Centerville	2,993,880,700
C—West Side	115,300,700
D—Vadnais	351,472,000

7. Average static head against which pumps work:
   A 135 ft.
   B 27 ft.
   C 193 to 223 ft.
   D Well Plant, head variable.

8. Average dynamic head against which pumps work:
   - A 141.52
   - B 31.63
   - C 198.15
   - D 37.3

9. Number of gallons pumped per pound of equivalent coal (5):
   - A 801
   - B 2,693
   - C 252
   - D 1,326

10. Duty:
   - A 95,820,098
   - B 71,089,462
   - C 41,732,482
   - D 41,338,165

11. Cost of pumping figured on pumping station expenses: $32,219.00.

12. Per million gallons raised one foot (dynamic):
   - A $0.04512
   - B 0.0694
   - C 0.1892
   - D 0.1819

STATISTICS RELATING TO DISTRIBUTING SYSTEM

1. Kind of pipe: Cast Iron.
2. Sizes: 4″ to 36″.
3. Extended during year: (feet) 93,360.
3a. Relaid during year: (feet) 292′ 6″.
4. Discontinued during year (feet): None.
5. Total now in use: (miles) 391.7287.
6. Cost of repairs per mile: $2.537.
7. Number of leaks in mains: 28.
8. Length of pipe less than 4 inches, temporary mains: (miles) 13.99.
9. Number of hydrants added during year: 125.
10. Number of hydrants now in use: 3,497.
11. Number of stop gates added during year: 152.
12. Number of stop gates now in use: 3,281.
13. Number of stop gates less than 4 inches: 45.
14. Number of blow-offs added during year: 6.
15. Range of pressure: 15 lbs. to 95 lbs.

SERVICES.

16. Kind of pipe: Lead to 2 inches; over 2 inches, galvanized and cast iron.
17. Sizes: ⅝ inch to 2 inches. Over 2 inches by special permit.
18. Extended: 53 replacements and enlargements.
19. Discontinued: Total to date: 326.
20. Total number connections: 36,925.
21. Number of service taps added during year: 1,998.
22. Number now in use: 36,365.
23. Average length of service: (feet) 30.
24. Average cost per service per year: 7.8c.
25. Number of meters added during year: 3,833.
26. Number of meters now in use: 30,442.
27. Percentage of service metered: 83.7%.
28. Percentage of receipts from metered water: 84.61%.
29. Number of motors and elevators added: None.
30. Number now in use: Not allowed.

STATISTICS ON CONSUMPTION OF WATER.

1. Estimated population to date: 251,240.
2. Estimated population on pipe lines: 213,800.
3. Estimated population supplied: 204,000.
4. Total consumption for year: (gallons) 4,885,443,011.
5. Passed through meters: (gallons) 2,992,715,084.
6. Percentage of consumption metered: 61.25%.
7. Average daily consumption: (gallons) 13,384,775.
8. Gallons per day to each inhabitant: 53.27.
9. Gallons per day to each consumer: 65.61.
10. Gallons per day per tap: 368.
11. Cost of supplying water, per million gallons, figured on total maintenance: $29.60.
12. Total cost of supplying water, per million gallons, figured on total maintenance plus interest on bonds and sinking fund: $64.75.

1914 SUMMARY OF CONSUMPTION.

Consumption on High Service	2,837,440,504 Gal.	58.08% of Total Supply
Consumption on Low Service	1,912,001,807 Gal.	39.14% of Total Supply
Consumption on West Side High Service	115,300,700 Gal.	2.36% of Total Supply
Consumption on Phalen Service, January to July 27th	20,700,000 Gal.	.42% of Total Supply
TOTAL	4,885,443,011 Gal.	100%

Pumped into Lake Como	59,231,124 Gallons
Maximum Day, High Service, July 21	13,923,809 Gallons
Minimum Day, High Service, November 30	4,987,956 Gallons
Average Daily Consumption	7,773,809 Gallons
Maximum Day, Low Service, September 25	7,149,401 Gallons
Minimum Day, Low Service, May 11	4,390,000 Gallons
Average Daily Consumption	5,554,253 Gallons
Maximum Day, West Side High Service, July 11	666,900 Gallons
Minimum Day, West Side High Service, April 5	235,600 Gallons
Average Daily Consumption	315,892 Gallons
Maximum Day, Combined Service, July 21	20,493,809 Gallons
Minimum Day, Combined Service, November 30	10,277,956 Gallons
Average Daily Consumption	13,384,775 Gallons

REFORESTING VADNAIS LAKE WATERSHED.

Vadnais Lake acts as a receiving (natural) reservoir from which all water supplied the city (except that from artesian wells) is drawn.

The Bureau of Water owns and controls the land bordering on the lake, amounting to several hundred acres. This land was originally timbered and is now lightly covered with scrub oak, which each year is being materially reduced by a root disease killing the trees. The dead trees are cut out periodically and used for fuel at the Vadnais Pumping Station.

The matter of reforesting this land was referred to the Forestry Division of the University of Minnesota and through their co-operation, advice and assistance, fifteen acres were prepared in April and 5,000 6″ to 8″ white pine, 5,000 6″ to 8″ Norway spruce and 3,000 8″ to 10″ white spruce seedlings were planted approximately six feet apart each way, of which it is estimated at least 80% have taken root and are growing.

The entire area has been surveyed and each year a section will be planted upon the advice and under the supervision of the Forestry Division of the University of Minnesota.

LAKE PHALEN SERVICE DISCONTINUED.

Owing to the rapid growth of the city in the vicinity of Lake Phalen and its continued and more frequent use as a public park lake, it has become impossible to patrol same and guard against contamination. The service was, therefore, discontinued on July 27, 1914, and the Phalen System of distributing mains opened so as to receive water from and be a part of low gravity service, which increased the pressure on the Phalen Service an average of four pounds.

WATER TREATMENT.

Between May and September further experiments were made, in conjunction with the state and city health authorities, by treating the water supplid the city with copper sulphate, for the purpose of reducing or eliminating algae, which at certain seasons is very noticeable.

Commercial copper sulphate in saturated solution was introduced at the outlet of Pleasant Lake at the rate of one part of copper sulphate to 2.3 millions parts of water, which had the effect of freeing the water which entered Sucker Lake from algae.

This water flows naturally into Vadnais Lake, but its effect in reducing the microscopic organisms in Vadnais Lake was not apparent, and therefore no good effects were secured for the water which was supplied the city. In all probability the use of copper sulphate administered by the boat method in Vadnais Lake would have the desired effect, but

DISTRIBUTION YARD NO. 1

DISTRIBUTION YARD NO. 1
BUILDINGS

since water supplied the city is drawn directly from Vadnais Lake, no time could be allowed for the copper treatment to take effect when no water was being drawn from the lake and it was not considered advisable to try the experiment.

It is planned to conduct further experiments along this line during the coming summer season, being guided by the results obtained from past experience.

STOREHOUSE BUILDINGS AND DISTRIBUTION YARD NO. 1.

In 1912 the Board of Water Commisioners purchased five acres of land on Hamline Ave., at the corner of Carroll Ave., for the purpose of establishing a yard for the storage of construction material and the construction of buildings and equipment in which to centralize the mechanical operations of the Department.

This property is located in the center of the growing district of the city and is on the spur from the Chicago, Milwaukee & St. Paul Short Line Railway.

During the year a spur track has been extended into the property; the necessary grading has been done; four service buildings of brick and concrete construction have been erected, and the property has been adequately fenced.

The entire equipment is modern and substantial and will be adequate for the needs of the Department for years to come.

30″ LOW SERVICE MAIN NO. 2.

During the summer a 30″ cast iron main has been laid from the Terminal Chamber at McCarron Pumping Station to the intersection of Cayuga and Mississippi streets, for the purpose of augmenting the supply now furnished the business district. This main duplicated, for three-fourths of its length, a similar 30″ main laid in 1884. Its installation has reduced the friction loss approximately 40 feet for a combined fire and domestic supply for 18,000,000 gallons per twenty-four hours.

It is expected that it will no longer be necessary to open the dividing gates betwen high and low service when the demand is great as in the case of a large fire.

Construction was commenced on March 2nd and the main put in service on August 5th; its length is 12,908 feet and its cost $92,739.03.

ST. ANTHONY PARK NORTH EXTRA HIGH GRAVITY SERVICE.

That portion of the northwestern part of the city, known as St. Anthony Park North, is at an elevation too high for proper service from the high service reservoir, on which account service has to be given from a distributing reservoir.

This was attempted first in 1908, when a 100,000-gallon tank was erected so as to make its overflow the same elevation as high water in the high service reservoir, and therefore, is not now satisfactory, and the pumping equipment has been outgrown.

During the past summer, a 200,000-gallon tower and tank has been erected so that its overflow is 43 feet above high water in the high service reservoir, and a pumping station equipped with two electrically driven centrifugal pumps has been installed in a brick and concrete building on the same property with the tank, at the corner of Cleveland Ave. and Dudley street.

This equipment will operate automatically and should give excellent service in any emergency at a minimum cost of operation and maintenance.

The equipment complete, including property, cost $15,716.59.

BOILER EQUIPMENT, CENTERVILLE PUMPING STATION.

During the past year it has been found necessary to replace a 54″x16′ return tubular boiler, installed in the Centerville Pumping Station in 1896, by a new boiler of like capacity and type, at a cost of $1,440.74.

EXTENSION OF DISTRIBUTION MAINS AND APPURTENANCES.

During the past year 80,341 linear feet of mains, from 4″ to 16″ inclusive, have been laid by the Department forces under the direction of the Engineering Division, at a total cost for labor and material of $97,-106.11, and for unloading and distributing the pipe, $1,872.89.

This mileage is slightly in excess of that laid in 1908 and 1909, and the greatest in any one year since 1890.

Details are more particularly shown on Tables Nos. 8-9-10, appended hereto.

ELECTROLYSIS.

On or about September first, a break occurred in a 6″ water main on Third street between College and Pleasant avenues. An investigation disclosed so much of the pipe badly corroded that it was necessary to relay the entire block.

Electrical tests were made and it was found that a small amount of current was flowing on the pipe and that there was a material difference in potential betwen the pipe and the rails of the St. Paul Street Railway Company, which parallels it for half the distance.

The services of Mr. Ray Palmer, of Chicago, were obtained for consultation, and as a result of his recommendations, the Street Railway Company and the Bureau of Water are making, jointly, a survey for the purpose of determining the condition of water mains in different sections

of the city, which will result in the laying out of an adequate system of insulated return feeders to properly carry the return current of the Street Railway Company to the generating stations rather than on the pipes of the Water Department, thereby minimizing, if not entirely eliminating, electrolysis.

For several years past, boards of water commissioners, engineers and superintendents have made specific recommendations for an improvement of the present equipment of the Water Department and new construction made necessary on account of the city's growth. The estimated cost of these improvements is considerably over $500,000.

In our opinion the services of a consulting engineer, competent to analyze conditions as to quality of water as well as supply, should be engaged to make a complete survey and report in detail a comprehensive plan to strengthen any weakness which may be found to exist, looking toward an adequate and proper water supply at least ten years in the future, and that the Bureau of Water adopt the policy of acting upon the recommendations so made as rapidly as financial conditions and propriety will warrant.

REORGANIZATION.

The reorganization chart, appended hereto, is made to conform with the requirements of the Commission Charter.

The administrative authority and responsibility is definitely fixed in the position of General Superintendent, whose function it is to carry into effect the policies determined upon by the Board of Water Commissioners and other commissioners or elective officers, who, by charter provision, are connected with the Bureau of Water.

The General Superintendent is accountable to the Board for economy and efficiency throughout the organization.

It is intended to logically classify and group the different functions, making a single officer responsible to the General Superintendent for the direction of each function. The functions of each subdivision have been clearly defined by bulletins and the duties and lines of authority of each position has been standardized and defined.

OSCAR E. KELLER,
President.

M. N. GOSS,
S. A. FARNSWORTH,

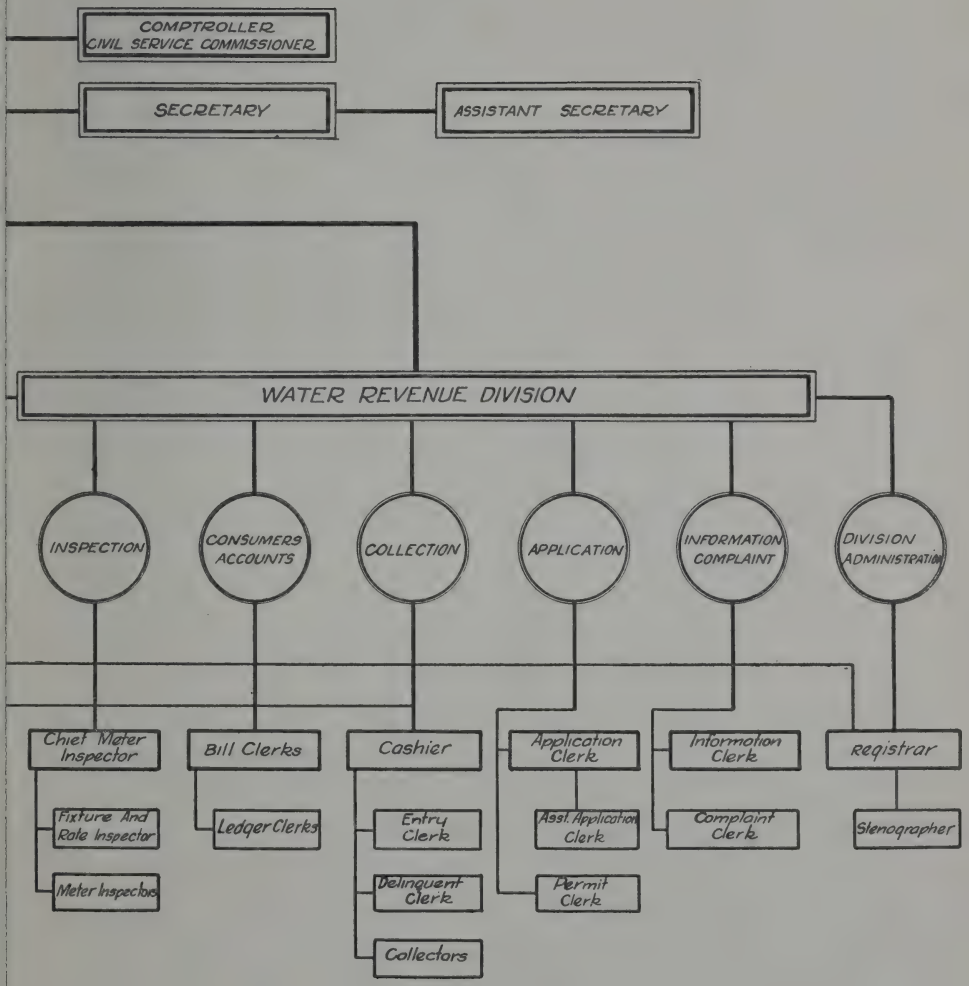
TABLE NO. 2.

DEPARTMENT OF PUBLIC UTILITIES—BUREAU OF WATER.

AVERAGE DAILY WATER CONSUMPTION IN GALLONS, 1904 TO 1914, INCLUSIVE.

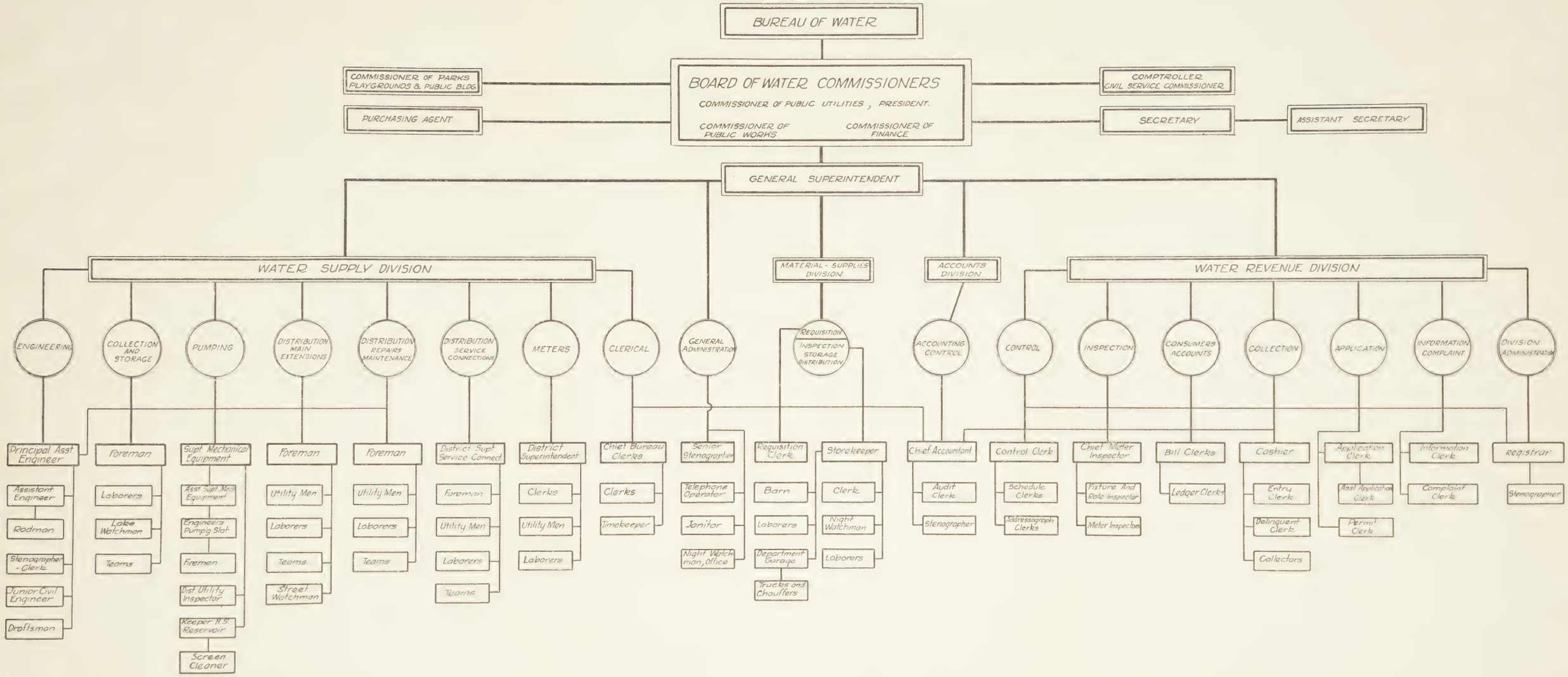
Years	MONTHS												Daily Average for the Year
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1904...	8,806,512	10,229,420	10,279,967	9,360,030	9,847,508	9,713,208	9,619,032	10,141,206	9,528,123	9,463,303	9,054,463	8,766,537	9,619,107
1905...	9,337,823	10,571,897	9,514,797	9,613,714	9,744,776	9,947,796	10,902,741	10,464,301	10,123,719	10,322,731	9,088,947	9,237,022	9,902,708
1906...	6,419,500	9,813,762	9,519,854	9,981,269	9,855,482	11,342,971	11,175,027	10,907,399	10,910,436	9,976,712	9,857,478	9,945,749	10,225,470
1907...	10,118,297	10,712,664	10,330,140	10,442,523	10,538,365	10,906,122	11,818,791	11,941,276	10,930,021	10,826,091	10,927,497	9,909,032	10,781,044
1908...	9,757,518	10,009,858	10,016,613	9,855,080	10,363,578	10,840,238	11,854,810	12,449,337	12,156,836	10,524,141	10,314,501	10,257,080	10,702,735
1909...	10,889,698	10,955,249	10,690,740	10,664,968	11,903,582	12,460,548	13,417,310	13,567,359	12,182,487	11,789,706	11,308,359	11,038,186	11,746,389
1910...	11,650,602	11,585,189	11,539,280	12,997,483	13,163,488	15,825,408	16,244,940	14,208,577	13,486,292	12,737,421	11,533,058	11,681,829	13,062,062
1911...	12,488,801	12,107,625	12,062,817	12,008,226	13,269,627	13,801,364	14,197,054	13,233,621	13,246,976	12,108,454	12,353,122	11,714,303	12,719,504
1912...	13,238,245	13,040,162	12,533,507	12,581,907	12,920,318	14,744,018	13,332,352	13,557,147	13,788,647	12,831,578	13,041,105	12,019,117	13,132,047
1913...	12,328,115	12,773,237	12,506,863	12,829,073	12,954,609	15,987,253	14,169,097	16,471,071	14,958,427	13,034,936	12,559,118	12,284,383	13,572,296
1914...	12,100,436	13,009,580	12,327,637	12,235,533	13,269,537	13,371,092	16,187,132	15,152,699	14,145,368	13,644,736	12,585,816	12,448,386	13,384,775

WATER


COMPTROLLER
CIVIL SERVICE COMMISSIONER
SECRETARY
ASSISTANT SECRETARY
WATER REVENUE DIVISION
INSPECTION
CONSUMERS ACCOUNTS
COLLECTION
APPLICATION
INFORMATION COMPLAINT
DIVISION ADMINISTRATION
Chief Meter Inspector
Fixture And Rate Inspector
Meter Inspectors
Bill Clerks
Ledger Clerks
Cashier
Entry Clerk
Delinquent Clerk
Collectors
Application Clerk
Asst. Application Clerk
Permit Clerk
Information Clerk
Complaint Clerk
Registrar
Stenographer

DEPARTMENT OF PUBLIC UTILITIES BUREAU OF WATER
CITY OF ST. PAUL, MINN.

ORGANIZATION CHART



ge y	Phalen service		West Side High Service		No. of taps total		Total No. of Meters	Per-cent of taps Meter-ed	Rain-fall ein ins.
	Total	Average Daily	Total	Average Daily	High	Low			
...		.....	.....	.....	164	2,762	144	4.9	26.11
...		.....	.....	.....	808	3,127	166	4.2	25.33
...		.....	.....	.....	1,447	3,496	200	4.1	22.89
...		.....	.....	.....	2,194	3,821	249	4.1	25.85
...		.....	.....	.....	3,006	4,227	284	3.9	25.86
...		.....	.....	.....	4,333	4,718	354	3.9	16.96
...		.....	.....	.....	5,404	5,054	440	4.2	23.38
...		.....	.....	.....	6,215	5,318	580	5.0	21.79
...		.....	.....	.....	6,886	5,528	656	5.3	32.55
...	Note: Venturi Meter was placed in position August 13 ,1894.	.....	10,015,722	27,440	7,360	5,679	713	5.5	25.95
,226		.....	9,123,418	24,986	7,723	5818	818	6.0	25.80
,070	167,704,807	459,565	10,529,520	28,848	8,123	6,129	1,109	7.8	24.26
,113	159,744,642	402,379	13,497,120	33,998	8,507	6,285	1,546	10.5	34.73
,471	157,642,706	431,898	16,018,200	43,885	8,839	6,383	2,300	15.1	30.52
,208	181,893,683	498,339	22,668,660	61,654	9,240	6,512	3,355	22.0	25.34
,495	161,350,000	442,054	18,803,280	51,515	9,743	6,675	4,063	24.8	27.54
,741	163,752,441	448,637	16,084,108	44,066	10,223	6,880	4,812	28.2	34.22
,342	100,720,384	275,946	17,682,660	48,445	10,811	7,112	5,593	31.2	25.75
,421	75,764,938	207,575	17,449,927	43,682	11,403	7,399	6,464	34.4	31.75
,579	77,789,921	212,569	24,090,899	66,002	12,135	7,657	7,127	36.1	37.87
,863	76,877,693	210,623	22,848,624	62,598	12,991	7,938	7,909	37.8	34.11
,028	66,998,066	183,556	27,962,711	76,610	13,967	8,277	8,909	40.1	30.76
,133	79,985,262	219,233	27,044,940	74,095	14,905	8,576	9,931	42.3	33.21
,147	82,438,576	225,859	24,873,453	68,147	15,915	8,868	10,958	44.3	23.07
,993	83,826,116	229,034	33,799,320	92,347	17,110	9,194	12,135	45.9	31.60
,043	83,002,146	227,403	33,141,420	90,798	18,467	9,596	13,628	48.6	31.82
,997	91,723,047	251,296	55,808,964	152,901	19,930	9,965	15,274	51.1	10.21
,059	91,798,085	251,501	97,829,280	268,025	21,298	10,258	16,810	53.2	40.44
,525	91,798,085	251,501	123,754,981	338,128	22,614	10,513	19,584	59.1	21.16
,907	131,560,020	360,438	124,357,684	340,706	34,563		26,661	77.1	24.05
,253	20,700,000	100,000	115,300,700	315,892	36,365		30,443	83.7	24.62
...	.....	.....	.....	.....	.....		.....	.....	.....
...	Discontinued	July 27, 1914	.....	.....	.....		.....	.....	.....
...	.....	.....	.....	.....	.....		.....	.....	.....
...	.....	.....	.....	.....	.....		.....	.....	.....
...	.....	.....	.....	.....	.....		.....	.....	.....
...	.....	.....	.....	.....	.....		.....	.....	.....

Note: After 1912 Number of Taps = Total in Service on all Services.

TABLE NO. 1

SHOWING WATER OBTAINED FROM VARIOUS SOURCES, CONSUMPTION ON DIFFERENT SYSTEMS, NUMBER OF SERVICES, PER CENT OF SERVICES METERED AND ANNUAL RAINFALL

ST. PAUL WATER WORKS

xxx-2321

Supersedes xxx-2321½ April 5, 1914

Year	Pumped into Vadnais			Total Pumped into Vadnais Lake	Gallons of water entering the Mains					Total Consumption		High service		Low Service		Phalen service		West Side High Service		No. of taps total		Total No. of Meters	Per-cent of taps Meter-ed	Rain-fall ein ins.
	From Baldwin Lake	From Centerville Lake	From Centerville Wells		From Vadnais Lake	From Vadnais Wells	From McCarron Wells	From Madson Wells	From Phalen Lake	Annual	Daily Avg.	Total	Average Daily	Total	Average Daily	Total	Average Daily	Total	Average Daily	High	Low			
1884																				164	2,762	144	4.9	26.11
1885												225,588,912	642,404							808	3,127	166	4.2	25.33
1886												309,363,560	847,541							1,447	3,496	200	4.1	22.89
1887												333,954,890	914,944							2,194	3,821	249	4.1	25.85
1888												484,507,080	1,327,418							3,006	4,227	284	3.9	25.86
1889												658,458,400	1,803,995							4,333	4,718	354	3.9	16.96
1890	1,491,926,000	Note: Previous to 1911 Water from Centerville Lake includes Water pumped from Centerville Wells.		1,491,926,000								788,087,400	2,159,142							5,404	5,054	440	4.2	23.38
1891	1,983,054,500			1,983,054,500								1,106,034,800	3,030,232							6,215	5,318	580	5.0	21.79
1892	1,153,794,000			1,153,794,000								1,071,130,320	2,934,603							6,886	5,528	656	5.3	32.55
1893	1,104,158,600			1,104,158,600								1,298,551,200	3,557,674							7,360	5,679	713	5.5	25.95
1894	1,449,360,000			1,449,360,000	2,387,343,000	337,160,000				2,724,502,440	7,464,391	1,116,987,600	3,882,158	1,307,514,840	3,587,226	Note: Venturi Meter was put in position at McCarron Station in 1897.		10,015,722	27,440	9,123,418	24,986	7,723	5818	818	6.0	25.80
1895	1,914,949,800			1,914,949,800	2,605,667,000	237,043,000			167,701,807	3,010,414,808	8,251,226	1,518,464,600	4,160,177	1,324,245,407	3,628,076			10,529,520	28,848	8,423	6,129	1,109	7.8	24.26
1896	1,917,058,000			1,917,058,000	2,268,944,000	1,056,878,516			159,744,642	3,551,165,511	9,169,494	1,651,324,200	4,160,011	1,542,896,699	4,227,113			13,497,120	33,998	8,597	6,285	1,546	10.5	34.73
1897		112,295,278		112,295,278	2,224,880,000	349,800,000			157,642,706	2,672,822,422	7,322,801	1,280,512,700	3,507,200	1,234,967,016	3,383,474			16,018,200	43,885	8,829	6,583	2,300	15.1	30.52
1898		595,535,200		595,535,200	1,921,347,636	924,765,600			181,893,683	2,920,017,722	8,000,048	1,456,168,200	3,989,501	1,281,955,839	3,512,208			22,668,660	61,654	9,240	6,512	3,355	22.0	25.34
1899		1,920,398,000		1,920,398,000	2,431,043,642	555,596,800			161,350,000	3,042,980,373	8,337,267	1,458,679,700	3,999,122	1,422,950,673	3,898,495			18,803,280	51,515	9,743	6,675	4,063	24.8	27.54
1900	5,782,500	1,057,764,000		1,063,546,500	2,476,758,282	311,731,000			163,732,441	2,928,780,631	8,024,057	1,447,107,400	3,964,677	1,317,920,790	3,610,741			16,084,108	44,066	10,225	6,880	4,812	28.2	34.22
1901		1,462,345,200		1,462,345,200	2,401,714,482	493,940,400			100,720,384	2,940,160,466	8,055,226	1,426,620,900	3,908,542	1,412,820,082	3,843,342			17,682,660	48,445	10,811	7,112	5,593	31.2	25.75
1902		2,088,359,800		2,088,359,800	2,413,433,524	462,744,040			75,764,938	2,944,269,489	8,066,492	1,426,965,800	3,909,495	1,411,568,751	3,949,421			17,449,927	47,682	11,403	7,399	6,464	34.1	31.75
1903		309,437,600		309,437,600	2,917,561,921	222,211,712			77,789,921	3,217,563,554	8,815,243	1,594,882,100	4,369,540	1,544,891,535	4,233,579			24,090,899	66,092	12,135	7,657	7,127	36.1	37.87
1904					3,167,789,790	266,306,632			76,877,693	3,505,974,115	9,605,408	1,744,561,633	4,779,619	1,684,535,322	4,628,863	76,877,693	210,623	22,848,624	62,598	12,991	7,938	7,909	37.8	34.11
1905					3,547,490,412				66,998,066	3,614,488,478	9,902,708	1,816,285,000	4,976,123	1,731,205,412	4,743,028	66,998,066	183,556	27,962,711	76,610	13,967	8,277	8,909	40.1	30.76
1906					3,650,456,193				79,985,262	3,729,700,555	10,215,617	1,929,406,900	5,285,040	1,720,308,393	4,714,133	79,985,262	219,233	27,044,940	74,095	14,905	8,576	9,934	42.3	33.21
1907					3,852,642,580	264,471,101			82,438,576	3,935,081,156	10,781,044	2,057,883,900	5,638,038	1,794,758,680	4,917,147	82,438,576	225,859	24,873,453	68,147	15,915	8,868	10,958	44.3	23.07
1908		1,185,441,400		1,185,441,400	3,833,374,820				83,826,116	3,917,200,936	10,702,735	2,139,163,300	5,844,708	1,694,211,520	4,628,993	83,826,116	229,034	33,799,320	92,347	17,110	9,194	12,135	45.9	31.60
1909		1,403,727,400		1,403,727,400	4,916,216,118	288,213,666			83,002,146	4,287,431,864	11,746,389	2,371,749,100	6,497,943	1,832,680,618	5,021,042	82,002,146	227,403	33,141,420	90,798	18,467	9,596	13,628	48.6	31.82
1910		2,824,505,000		2,824,505,000	3,882,766,535	792,163,325			91,723,047	4,767,652,907	13,062,062	2,689,600,900	7,368,769	1,986,328,960	5,441,997	91,723,047	251,296	55,808,964	152,904	19,930	9,965	15,274	51.1	40.21
1911		2,679,632,500	656,440,781	3,336,073,381	2,489,130,102	959,632,500	885,528,224	216,530,283	91,798,085	4,442,619,194	12,719,504	2,619,949,600	7,177,944	1,930,871,500	5,290,059	91,798,085	251,501	97,829,280	268,025	21,298	10,258	16,810	53.2	40.44
1912		2,720,936,800		2,720,936,800	4,137,124,174	577,412,000			91,798,085	4,806,329,259	13,132,047	2,869,674,900	7,676,707	1,904,856,274	5,204,525	91,798,085	251,501	123,754,981	338,128	22,614	10,513	19,584	59.1	21.16
1913		2,740,440,500		2,740,440,500	4,573,117,706	219,210,400			131,560,020	4,896,944,501	13,415,466	2,820,043,740	7,725,119	1,943,051,141	5,328,907	131,560,020	360,438	124,257,084	340,706	24,563		20,661	77.1	24.05
1914		2,993,880,700		2,993,880,700	4,513,271,011	351,472,000			20,700,000	4,885,443,011	13,384,775	2,837,440,504	7,773,809	2,027,302,507	5,554,253	20,700,000	100,000	115,300,700	315,892	36,365		30,443	83.7	24.62
1915																Discontinued	July 27, 1914							
1916																								
1917																								
1918																								
1919																								
1920																								

Note After 1913 Number of Taps Total in Service on all Services.

TABLE NO. 3.

BUREAU OF WATER—CITY OF ST. PAUL, MINN.

REPORT FOR CENTERVILLE STATION, 1914.

Month	No. Hours Operating	Total Number Gallons Pumped	Average Rate (No. Gallons Per 24 Hours)	Total Pounds Coal Used	Pounds of Ashes	No. Gallons Per Pound of Coal
January	100	63,313,800	15,195,312	30,000	2,441	2,110
February	666	411,449,200	14,826,998	163,200	11,908	2,521
March	744	474,799,200	15,316,103	181,800	14,003	2,611
April	720	460,029,600	15,334,320	171,080	13,280	2,689
May	625	399,648,000	15,346,464	145,500	11,770	2,746
June	711½	410,359,400	13,678,646	148,700	8,475	2,759
July						
August						
September	685	435,087,500	15,242,739	152,700	7,247	2,849
October	536	339,194,000	15,168,144	118,500	4,740	2,862
November						
December						
TOTALS	4,787½	2,993,880,700	15,008,496	1,111,480	73,864	2,693

Total lift in feet	31.63
Total number gallons pumped	2,993,880,700
Number of hours in operation	4,787.5
Total number of pounds of coal used*	1,117,440
Total number pounds combustible	1,043,576
Percentage of ash	6.61%
Duty for station	71,089,462
Fuel: Youghiogheny Lump, B. T. U. basis, per ton	$5.30

*Note: Coal for heating building and changing boilers included.
Coal used to heat building during Oct., Nov. and Dec. 45,200

TABLE NO. 4.

BUREAU OF WATER—CITY OF ST. PAUL, MINN.

REPORT FOR VADNAIS STATION, 1914.

Month	Number of Hours Operating	Total Number of Gallons Pumped	Average Rate (No. Gallons Per 24 Hours)	Wood Consumed Expressed in Equivalent Coal	Pounds of Ashes	No. Gallons Per Pound of Coal	No. Pounds of Coal Used
January							
February							
March							
April							
May							
June	252	42,372,000	4,100,514	42,000		1,008	
July	744	128,418,400	4,142,530	83,469		1,538	
August	731	131,982,400	4,333,200	104,501		1,263	
September	261½	48,699,200	4,469,520	34,650		1,405	
October							
November							
December							
TOTALS	1,988½	351,472,000	4,242,048	264,620		1,326	

Total lift in feet 37.3
Total number of gallons pumped 351,472,000
Total number of pounds of coal (1 cord wood equivalent to 1,283.3 pounds coal) .. 337,771
Duty for station 41,338,165
Fuel: Oak wood.

TABLE NO. 5.

BUREAU OF WATER—CITY OF ST. PAUL, MINN.

REPORT FOR McCARRON STATION, 1914.

Month	Number of Hours Pumped			Gallons Pumped			Total Gallons Pumped
	Engine No. 1	Engine No. 2	Engine No. 3	Engine No. 1	Engine No. 2	Engine No. 3	
January	.....	739	.....	.....	215,533,514	.....	215,533,514
February	.....	640	40	.....	202,512,376	9,735,869	212,248,245
March	.....	735	.....	.....	222,066,746	.....	222,066,746
April	.....	716	10	.....	216,526,494	2,509,507	219,036,001
May	.....	744	.....	.....	250,595,660	.....	250,595,660
June	.....	720	40	.....	258,317,030	7,643,636	265,960,666
July	.....	736	230½	.....	269,844,936	48,489,176	318,334,112
August	.....	720	149½	.....	273,422,310	31,541,278	304,963,588
September	.....	722	.....	.....	246,889,350	.....	246,889,350
October	.....	699	37	.....	221,672,960	10,312,877	231,985,837
November	.....	638	75½	.....	183,845,400	19,782,048	203,627,448
December	.....	736	.....	.....	207,939,968	.....	207,939,968
TOTALS	.....	8,545	582	.....	2,769,166,744	130,014,391	2,899,181,135

TABLE NO. 5—Continued.

BUREAU OF WATER—CITY OF ST. PAUL.

REPORT FOR McCARRON STATION, 1914.

Month	Gallons Pumped Daily Average	Total Number Pounds of Coal*	Ashes	Gallons Per Pound of Coal
January	6,952,694	308,950	23,713	698
February	7,580,294	291,430	21,665	729
March	7,163,443	279,913	21,467	793
April	7,301,200	282,119	20,361	776
May	8,083,731	302,450	16,357	829
June	8,865,355	312,163	11,537	852
July	10,268,842	358,420	16,664	888
August	9,837,535	341,616	14,311	893
September	8,229,645	275,481	12,239	896
October	7,483,414	267,962	10,838	866
November	6,787,581	260,699	14,861	781
December	6,707,740	291,615	21,026	713
Totals and Averages	7,942,962	3,572,818	205,039	801

Fuel: Youghiogheny Lump, B. T. U. basis, per ton, $4.75.
Note: 59,231,124 gallons pumped into Lake Como is included in these totals.
*Does not include coal changing boilers.

Average lift in feet	141.52
Total number of gallons pumped	2,899,181,135
Daily average gallons pumped	7,942,962
Pounds of coal consumed (less coal changing boilers)	3,572,818
Pounds of coal changing boilers	13,438
Pounds of coal combustible	3,386,217
Percentage of ash	5.71%
Duty of station in foot pounds per 100 pounds of coal	95,820,089

ECONOMIC RESULTS.

Feed water evaporation (cubic feet)	439,452
Average temperature of feed water	124°
Weight of one cubic foot taken as	61.67
Average steam pressure (from gauge)	124
Pounds of coal as fired	3,591,256
Ashes, clinkers, etc	205,039
Total coal combustible	3,386,217
Percentage of ash in coal	5.71%
Total weight of feed water evaporated	27,101,005

Pounds of water evaporated per pound of coal as fired $\frac{27,101,005}{3,591,256} = 7.5461$

Equivalent evaporation from and at 212° $\frac{27,101,005}{3,591,256} \times 1.1337 = 8.5550$

Pounds of water evaporated per pound of coal combustible $\frac{27,101,005}{3,386,217} = 8.0033$

Equivalent evaporation from and at 212° $\frac{27,101,005}{3,386,217} \times 1.1337 = 9.0734$

TABLE NO. 6.

BUREAU OF WATER—CITY OF ST. PAUL, MINN.

REPORT FOR WEST SIDE HIGH SERVICE STATION, 1914.

Month	Number of Hours Operating	Total Number Gallons Pumped	Gallons Pumped Daily Average	Total Pounds Coal Used	Pounds of Ashes	No. Gallons Per Pound Coal
January	223:48	8,565,200	276,297	36,400	4,100	235
February	195:42	7,843,200	280,114	30,700	3,425	255
March	204:05	8,223,200	265,265	32,200	3,800	255
April	198:25	7,829,800	260,993	34,300	4,100	228
May	261:20	10,108,900	326,093	37,300	4,300	271
June	260:50	9,928,300	330,943	37,300	4,950	266
July	358:00	15,181,000	489,709	50,300	5,375	302
August	310:35	12,414,100	400,455	51,100	6,175	243
September	232:45	9,342,300	311,410	36,600	4,175	255
October	218:00	8,985,100	289,842	36,800	4,175	244
November	214:00	8,498,700	283,290	36,400	4,725	233
December	216:35	8,380,900	270,351	37,400	4,625	224
TOTALS	2,894:05	115,300,700	315.892	456,800	53,925	252

Average lift	198.15
Total number of gallons pumped, Engine No. 1	1,777,800
Total number of gallons pumped, Engine No. 2	113,522,900
Total number of pounds coal used*	461,000
Total number of pounds coal combustible	407,075
Percentage of ash	11.70%
Number hours in operation, Engine No. 1	57:05
Number hours in operation, Engine No. 2	2,835:00
Duty for station	41,732,482
Fuel: Bituminous Smokeless, Mine Run, B. T. U. basis, per ton	$5.00

Engine No. 1, Blake Duplex Compound, 1 million gallons per 24 hours.
Engine No. 2, Allis Chalmers Horizontal Cross Compound Condensing, 1.5 mil. gal. per 24 hours.
*Coal for heating building and changing boilers included in above statement.

TABLE NO. 7.

BUREAU OF WATER—CITY OF ST. PAUL, MINN.

OPERATING EXPENSES FOR PUMPING STATIONS, 1914.

Station	Total Number Gallons Pumped	Average Lift in Feet	Cost of Raising 1,000,000 Gallons One Foot			
			Salaries	Fuel	Supplies, Repairs, Waste and Machine Oil	Totals
McCarron High Service	2,899,181,135	141.52	.0239	.0195	.0167	.0451
McCarron Air Lift	Not in Operation	.....	.....	.....	.....	.....
West Side High Service	115,300,700	189.15	.1256	.0506	.0131	.1892
West Side Well Plant	Not in Operation	.....	.....	.....	.....	.....
Vadnais	351,472,000	37.30	.1074	.0629	.0062	.1819
Centerville Lake	2,993,880,700	31.63	.0349	.0294	.0050	.0694
Centerville Wells	Not in Operation	.....	.....	.....	.....	.....

TABLE NO. 8.

ST. PAUL WATER WORKS.

1914 EXTENSION RECORD SUMMARY SHEET.

December 31, 1914.

Foreman	No. of Jobs	Total Number Feet Laid: 4 Inch	6 Inch	8 Inch	12 Inch	16 Inch	Total Labor Costs	Total Material Costs	Labor Cost Per Foot: 4 Inch	6 Inch	8 Inch	12 Inch	16 Inch	Total Cost
Peter Standaert	47	735	25,669	2,917	3,788	43	$11,615.78	$22,182.02	$0.303	$0.334	$0.316	$0.494	$0.400	$33,797.80
Richard Carter	19	.....	13,758	48	6,893	2,685	14,675.26	21,865.77	.....	.435	.....	.490	.670	36,541.03
Ole Munson	22	.....	17,859	520	1,808	.....	7,880.19	13,237.80	.....	.370	.43	.579	.....	21,117.99
Phillip Standaert	6	.....	2,139	.....	815	664	1,908.97	3,740.32	.....	.398	.....	.625	.827	5,649.29
TOTALS	.....	735	59,425	3,485	13,304	3,392	$36,080.20	$61,025.91	$0.303	$0.368	$0.373	$0.534	$0.698	$97,106.11
			110 laid by G. N. Rebeck											
			59,535				Average Material Cost		.4476	.5704	.7609	1.340	2.002	

	4 In. Gates	6 In. Gates	8 In. Gates	12 In. Gates	16 In. Gates	Smith Patent Gates Installed: 4x6 In.	6x6 In.	6x12 In.	6x16 In.	6x20 In.	4x8 In.	4x12 In.	4x16 In.	6x8 In.
Gates installed on mains*	...	85	9	10	4	1	4	3	2	1	..	...	..	..
Gates installed on hydrants	2	11	..	..	..	..	..	1	1	..	..	..	..	..
Gates installed on fire services	...	5	..	..	..	3	5	2	1	..	1	1	1	1
Gates installed, private and misc	...	2	..	..	..	1	2	2	1	..	1	..	..	..
TOTALS*	2	103	9	10	4	5	11	8	5	1	2	1	1	1

Total number feet of mains laid=80,452; 12,908 feet on 30-inch supply from terminal chamber to Mississippi street; total 93,360 feet.

Automatic fire services installed = 17

Single steamer hydrants set = 120

Double steamer hydrants set = 5

Private hydrants set = 1 double steamer

Single steamer hydrants replaced by double steamers=2

*Do not include valves on new 30-inch main { 6 30-inch gates; 2 24-inch gates; 5 air valves; 6 30x8 inch blowoffs; 6 6-inch gates

Mains relaid, 292 feet of 6-inch.

Mains laid on high service	65,507 feet	12.4066 miles
Mains laid on low service	22,114 feet	4.1882 miles
Mains laid on W. S. high service	5,739 feet	1.0869 miles
Total mains, 1914	93,360 feet	17.6817 miles

Teams, rate per hour	60	cents
Caulkers, rate per hour	27½	cents
Common labor, per hour	25	cents
Foreman Munson, per hour	40	cents
Foreman Carter, per hour	35	cents
Foreman T. Standaert, per hour	35	cents
Foreman P. Standaert, per hour	30	cents

TABLE NO. 9.

Service	4 Inch	6 Inch	8 Inch	12 Inch	16 Inch	20 Inch	24 Inch	30 Inch	36 Inch	Total Feet	Total Miles
High Service	42,616	1,035,184.4	13,821	206,910.8	133,552	36,224	19,161	20,466	19,492	1,527,427.2	289.2856
Low Service	33,100	240,300.5	10,397	74,548.0	49,137	8,342	8,765	29,344	18	453,951.5	85.9752
West Side High Service	326	73,141.5	.....	9,536.0	3,950	.....	.....	.....	.....	86,953.5	16.4679
TOTALS	76,042	1,348,626.4	24,218	290,994.8	186,639	44,566	27,926	49,810	19,510	2,068,332.2	391.7287

Total 4-inch pipe	76,042.0 feet
Total 6-inch pipe	1,348,626.4 feet
Total 8-inch pipe	24,218.0 feet
Total 12-inch pipe	290,994.8 feet
Total 16-inch pipe	186,639.0 feet
Total 20-inch pipe	44,566.0 feet
Total 24-inch pipe	27,926.0 feet
Total 30-inch pipe	49,810.0 feet
Total 36-inch pipe	19,510.0 feet
TOTAL	2,068,332.2 = 391.7287 miles

PLATE NO.

Showing Annual Extensions Of Mains From 1882 To 1914 Inclusive.

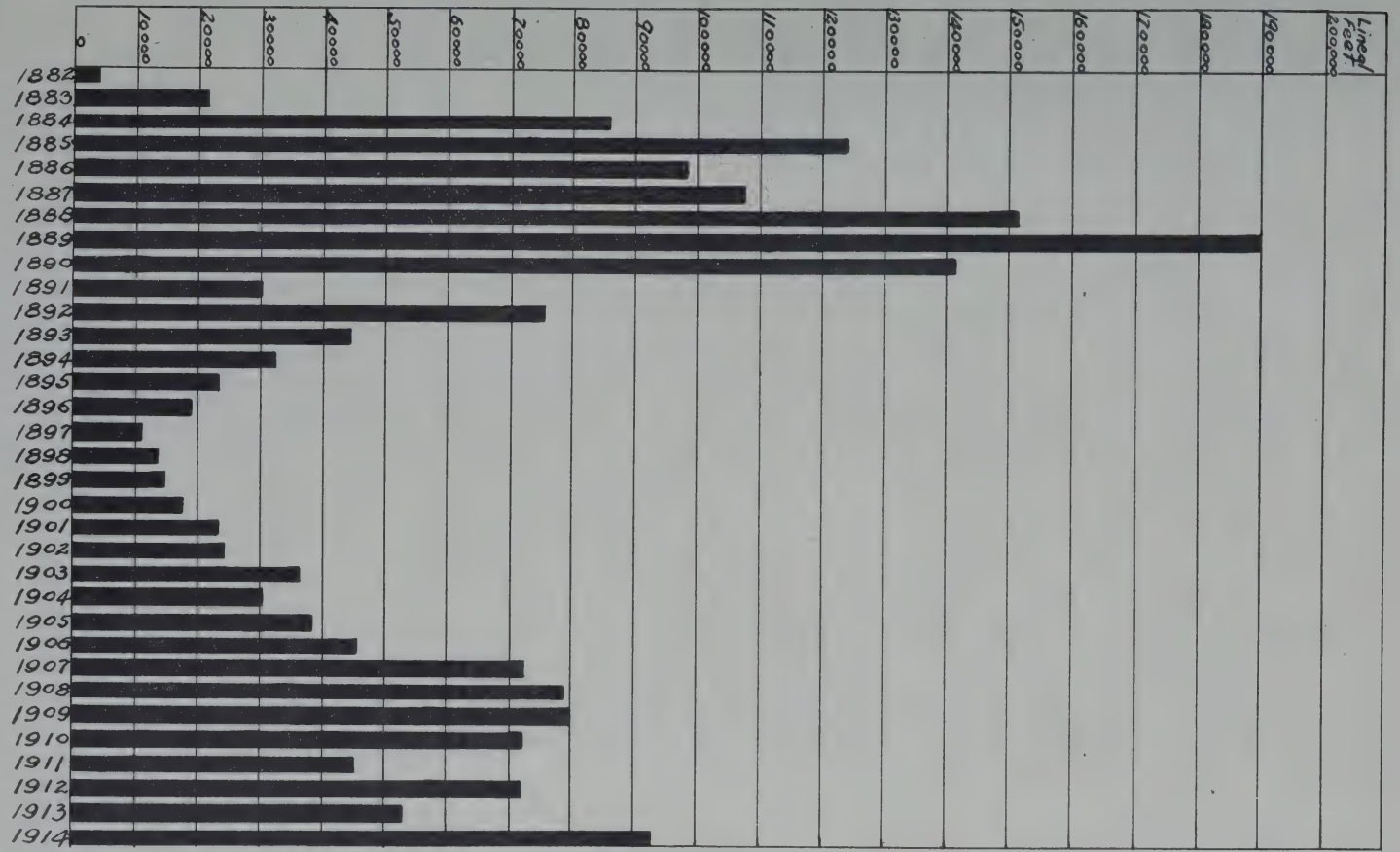


TABLE NO. 11.

THE WATER DEPARTMENT OF THE CITY OF SAINT PAUL.

Classification of Meters in Use December 31st, 1914.

Name of Meter	Size in Inches											Total
	5/8	3/4	1	1 1/4	1 1/2	2	3	4	6	8	10	
American	21											21
Buffalo	1											1
Badger	10											10
Columbia	3											3
Crown	81	15	19		19	5	1	2				142
Crown "A"	9690	690	555		266	148	13	14	3			11379
Crown "AA"	628		13		5	1	5	1				653
Empire	8	9	20			1						38
Empire "A"	3	3	2				1					9
Empire "AA"	1		1									2
Empire "AAX"	4	1										5
Eureka							1	1				2
Enare	1	6										7
Gem											1	1
Gem "AA"								4	2	1	1	8
Gem Compound								1	2			3
Hersey	5	3	1		1							10
Hersey Rotary	22	17	17		11	10	2	2				81
Hersey Disc	7	2	1			1				1		12
Hersey Detector									2			2
Keystone	12728	357	272	120	75	63	3	2				13620
Lambert	12											12
N. E.				1								1
Nash	27	1	2									30
Nash "A"	20	2			2			5				29
Nash "AA"	40				1		1					42
Niagara	279	83	17		4	2						385
Nilo								1				1
Pittsburgh Disc	3481	47	50		24	15	1					3618
Thomson	4											4
Thomson "B"	13	3	1					1				18
Thomson Lambert			1									1
Trident	41		3									44
Trident "Crest"								1				1
Union Rotary	31	14	3		19	2	1	2	1			73
Union "RA"		16	19		9	5						49
Westinghouse			1			2						3
Worthington, Imp.	23	18	12		17	3		1				74
Worthington, O. S.	1											1
Worthington, Disc.	25				1				1			27
Not classified	14	6										20
	27224	1293	1010	121	454	258	29	38	11	2	2	30442

Domestic—

5/8 inch	27,224	
3/4 inch	1,293	
		28,517

Commercial—

1 inch	1,010	
1 1/4 inch	121	
1 1/2 inch	454	
2 inch	258	
3 inch	29	
4 inch	38	
6 inch	11	
8 inch	2	
10 inch	2	
		1,925
Total Commercial and Domestic Meters		30,442

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